A (Seq Id No. 1)

```
1                                                                  50
QETCGTMVRALMPCLPFVQGKEKEPSKGCCSGAKRLDGETKTGPQRVHAC
51                                                                100
ECIQTAMKTYSDIDGKLVSEVPKHCGIVDSKLPPIDVNMDCKTVGVVPRQ
101
PQLPVSLRHGPVTGPSDPAHKARLERPQIRVPPPAPEKA
```

B (Seq Id No. 2)

```
1                                                                  50
QETCGTMVRALMPCLPFVQGKEAAPSAGCCSGAKRLDGETKTGPQRVHAC
51                                                                100
ECIQTAMKTYSDIDGKLVSEVPKHCGIVDSKLPPIDVNMDCKTVGVVPRQ
101
PQLPVSLRHGPVTGPSDPAHKARLERPQIRVPPPAPEKA
```

C (Seq Id No. 3)

```
1                                                                  50
EEACGKVVQDIMPCLHFVKGEEKEPSKECCSGTKKLSEEVKTTEQKREAC
51                                                                100
KCIVRATKGISGIKNELVAEVPKKCDIKTTLPPITADFDCSKIQSTIFRG
101
YY
```

D (Seq Id No. 4)

```
1                                                                  50
EEACGKVVQDIMPCLHFVKGEEAAPSAECCSGTKKLSEEVKTTEQKREAC
51                                                                100
KCIVRATKGISGIKNELVAEVPKKCDIKTTLPPITADFDCSKIQSTIFRG
101
YY
```

Fig.1

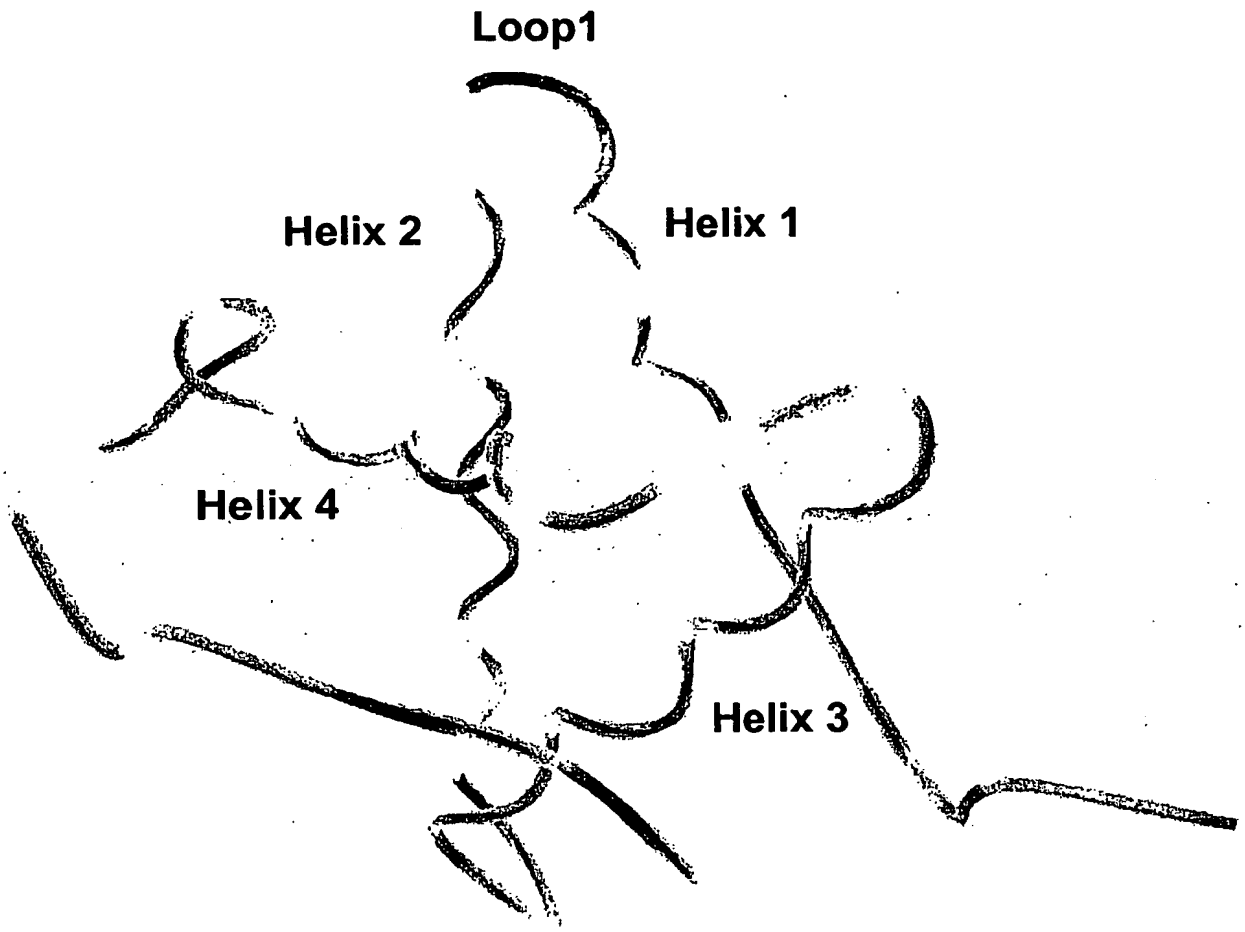


Fig. 2

```
      1          10         20 ↓↓  ↓     35          45
Parj 1 QETCGTMRV ALMPCLPFVQ GKEKE PSKGCCSGAKR LDGETKTGP QRVHACECIQT
Parj 2 EEACGKVVQ DIMPCLHFVK GEEKE PSKECCSGTKK LSEEVKTTE QKREACKCIVR
                  alpha 1   loop1   alpha 2     loop2     alpha 3

         56        62        71                  88
Parj 1   AMKTYS    DIDGKLVSE VPKHCGIVVSKLPPIDV NMDCK TVGVVPRQPQL
Parj 2   ATKGISGI KNELVAEVP   KKCDIKTTLPPITA  DFDCS KIQSTIFRGYY
         Loop3     alpha 4       loop4       beta
```

Fig. 3

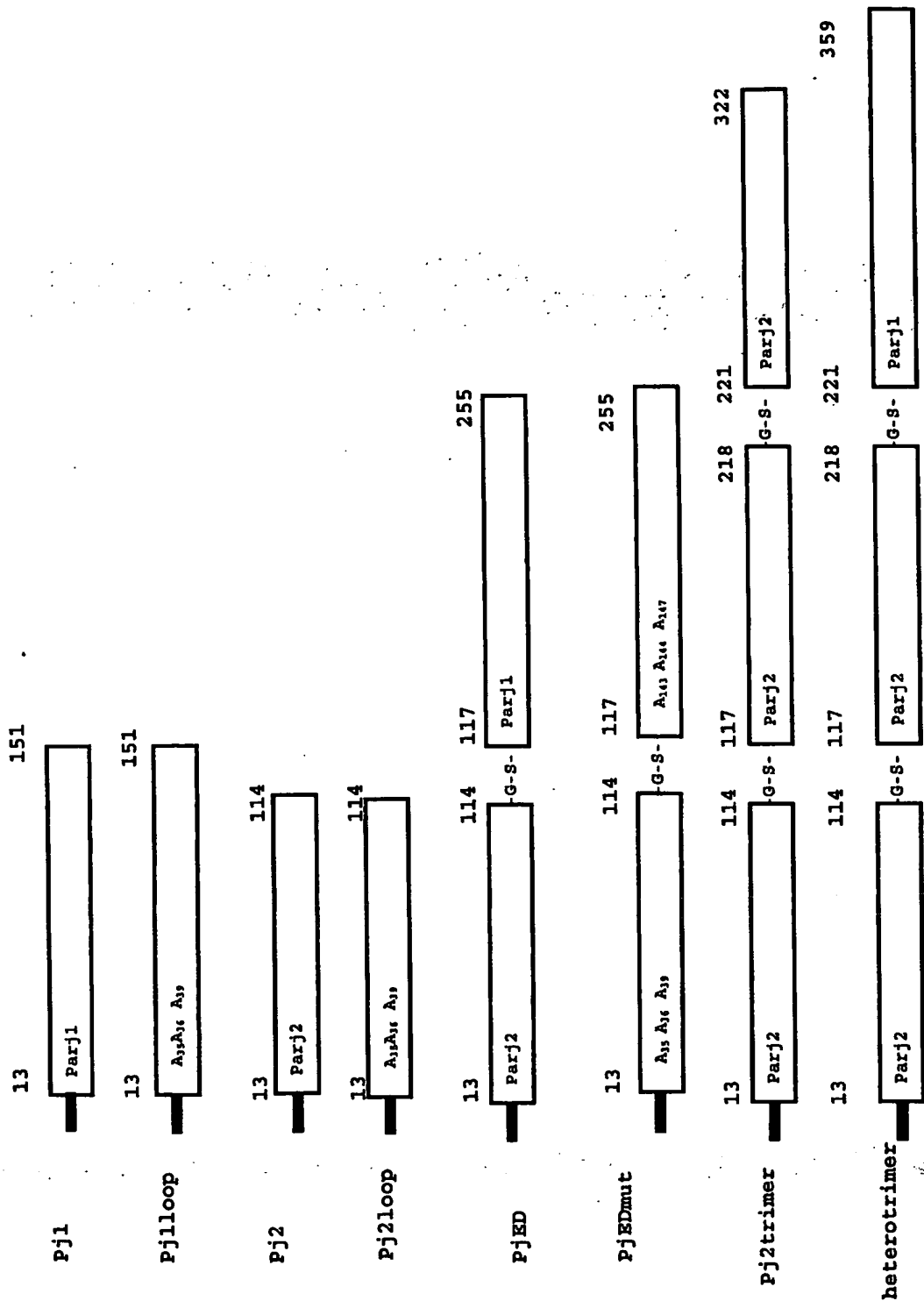

Pj1
Pj1loop
Pj2
Pj2loop
PjKD
PjEDmut
Pj2trimer
heterotrimer
Parj1
Parj2
G-S-
13
151
114
255
117
218
221
322
359

Fig. 4

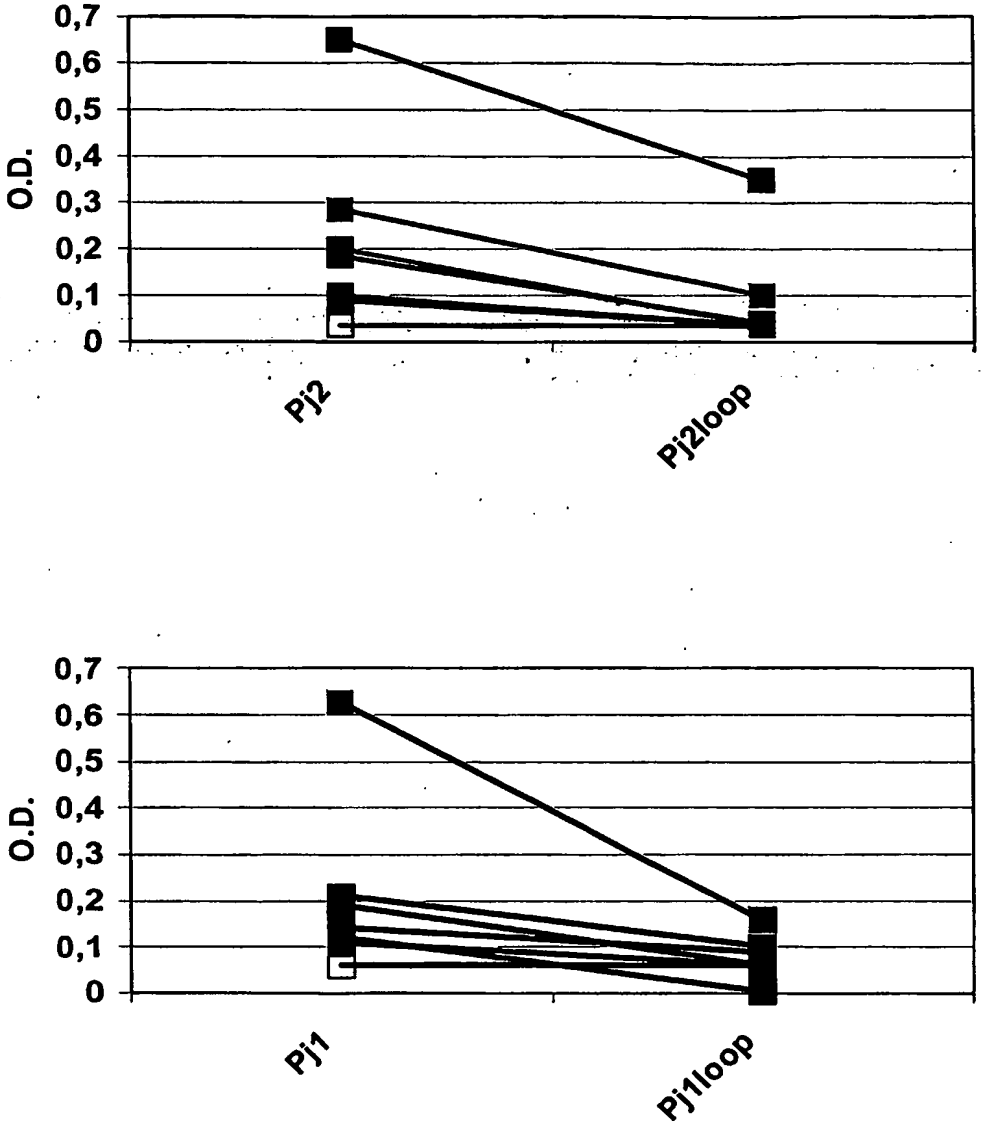
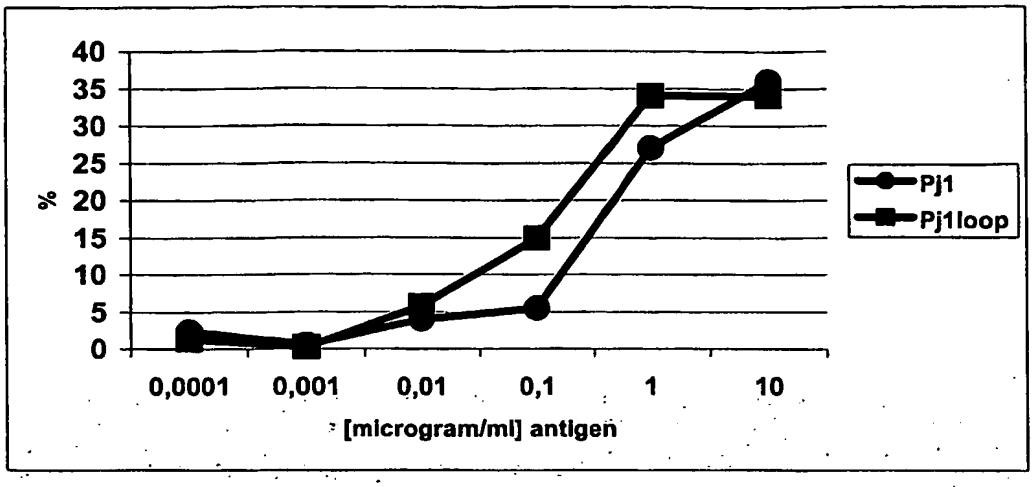
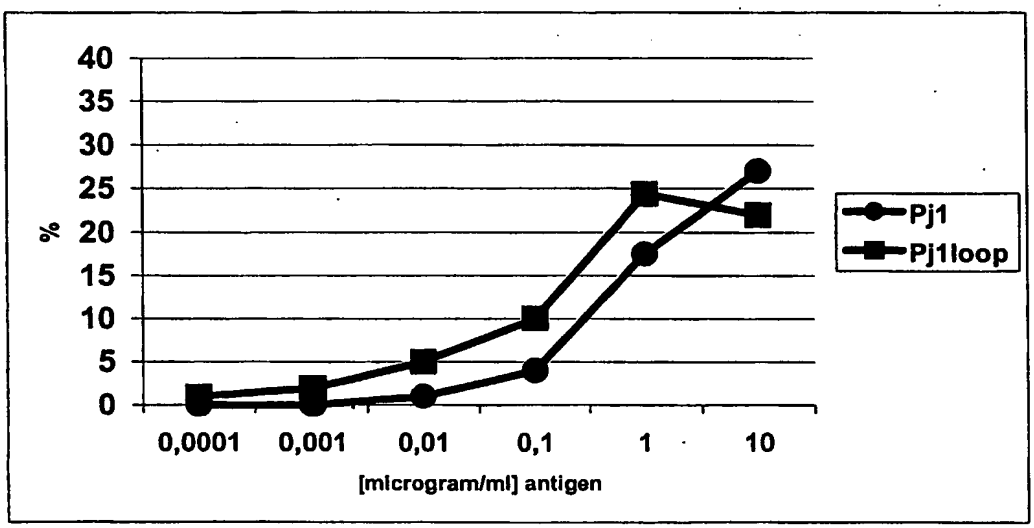

0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
O.D.
Pj2
Pj2loop
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
O.D.
Pj1
Pj1loop

Fig. 5

A


40
35
30
25
%
20
15
10
5
0
0,0001
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Pj1
Pj1loop

B


40
35
30
25
%
20
15
10
5
0
0,0001
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Pj1
Pj1loop

C

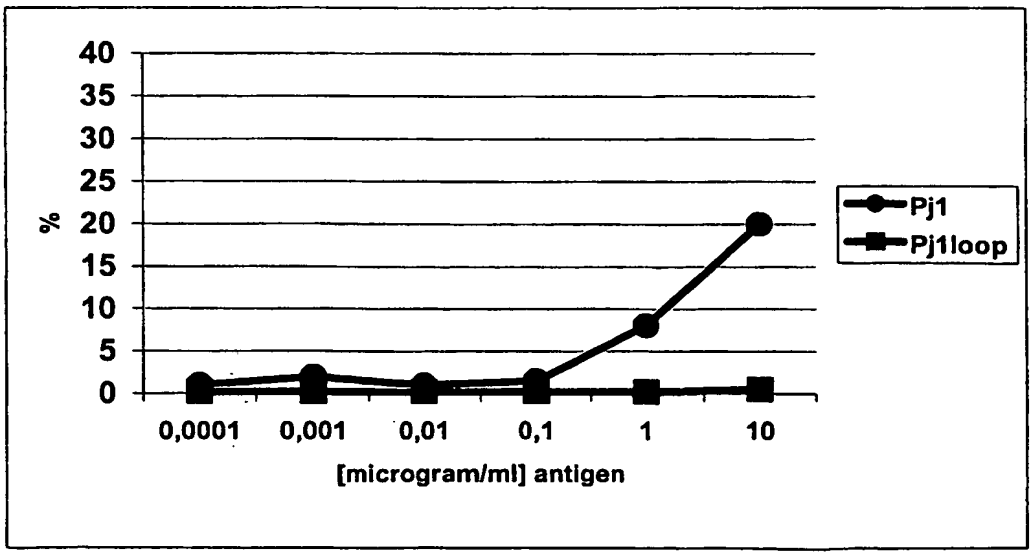
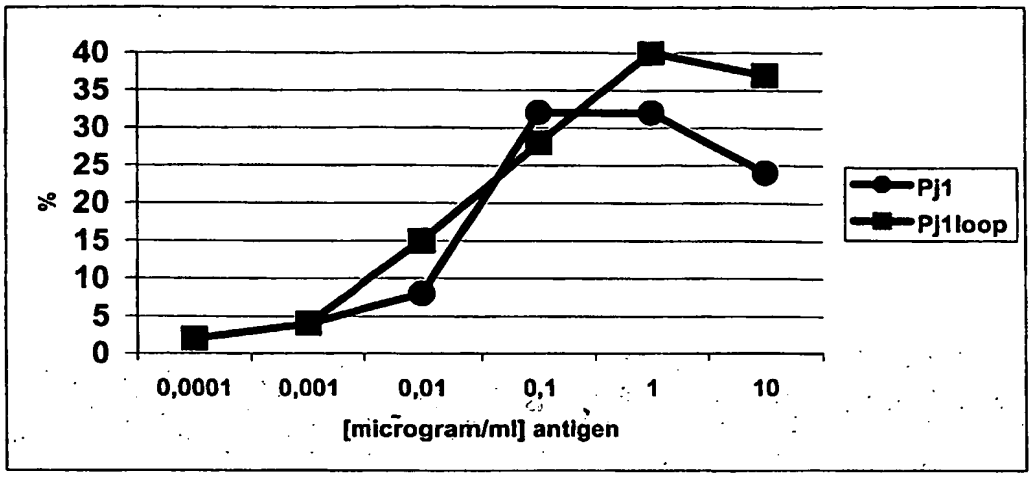

40
35
30
25
%
20
15
10
5
0
0,0001
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Pj1
Pj1loop

Fig. 6 (1/3)

D


40
35
30
25
20
15
10
5
0
%
0,0001
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Pj1
Pj1loop

E

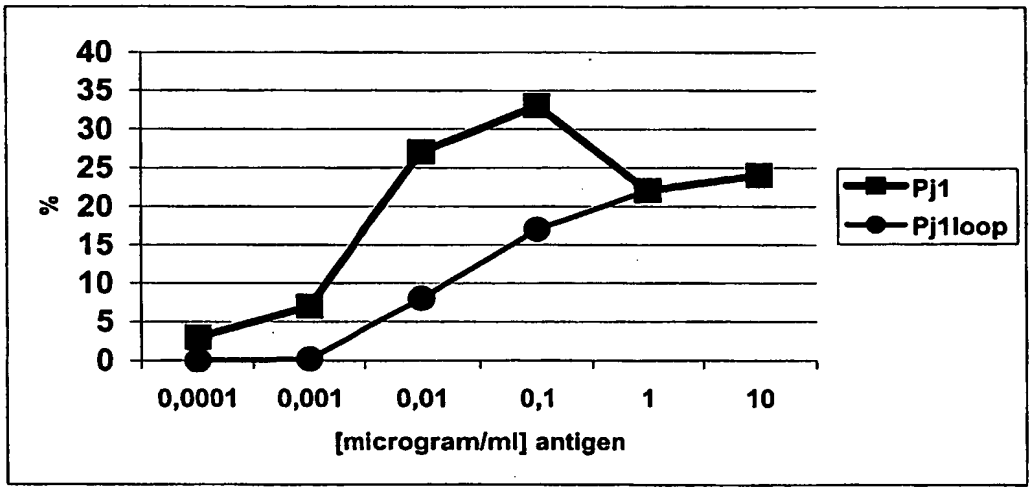
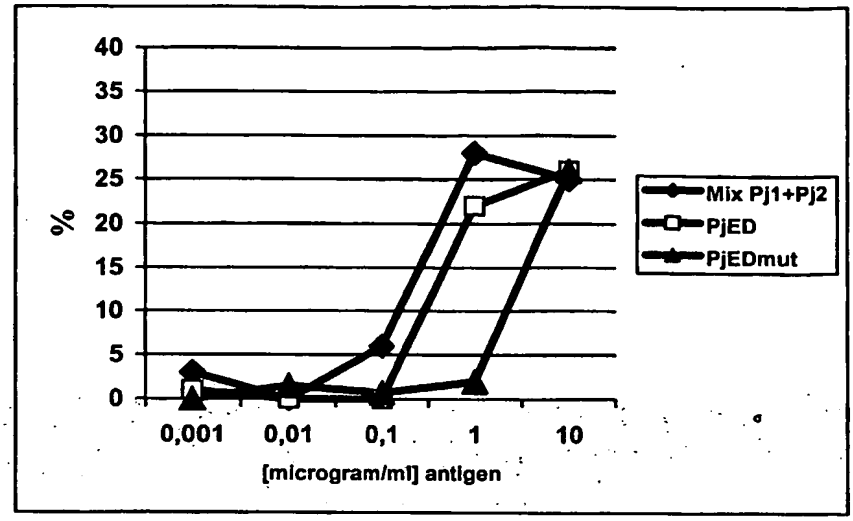
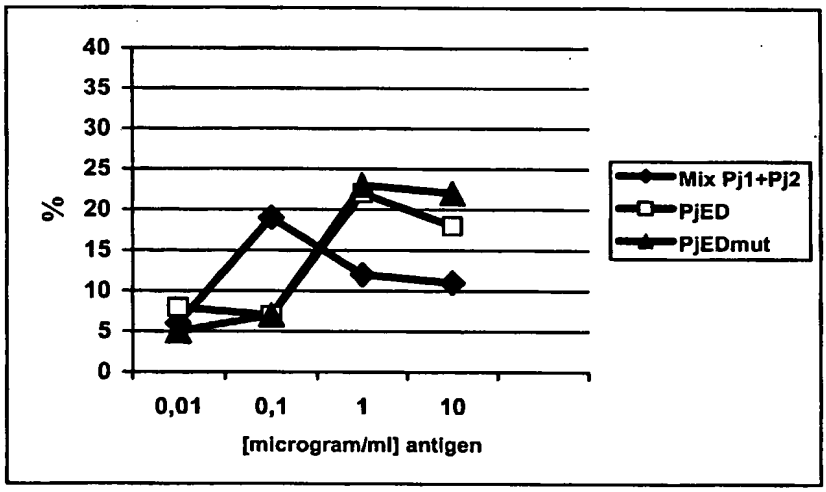

40
35
30
25
20
15
10
5
0
%
0,0001
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Pj1
Pj1loop

Fig. 6 (2/3)

F


40
35
30
25
20
15
10
5
0
%
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Mix Pj1+Pj2
PjED
PjEDmut

G


40
35
30
25
20
15
10
5
0
%
0,01
0,1
1
10
[microgram/ml] antigen
Mix Pj1+Pj2
PjED
PjEDmut

H

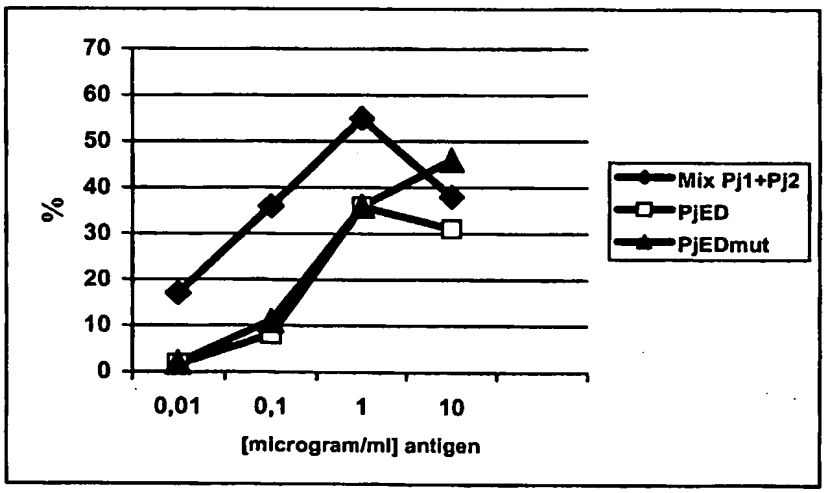

70
60
50
40
30
20
10
0
%
0,01
0,1
1
10
[microgram/ml] antigen
Mix Pj1+Pj2
PjED
PjEDmut

Fig. 6 (3/3)

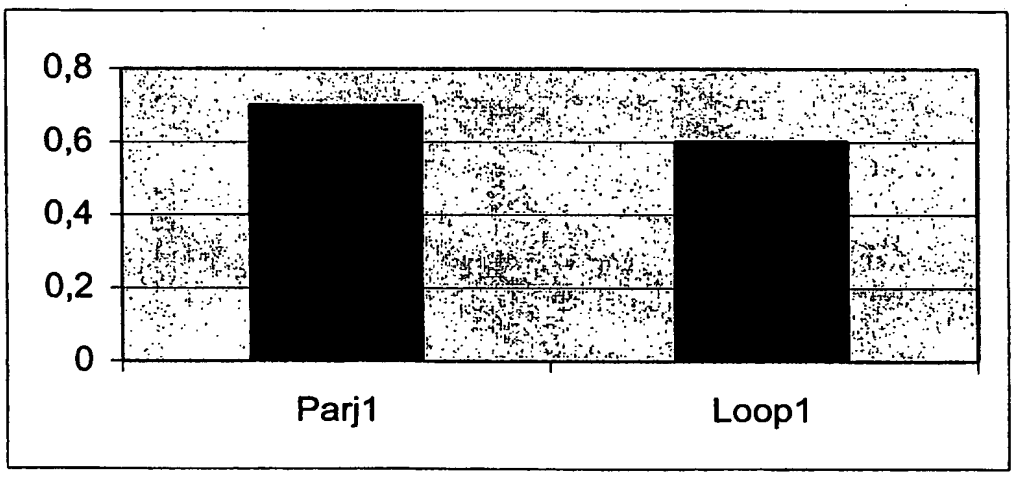
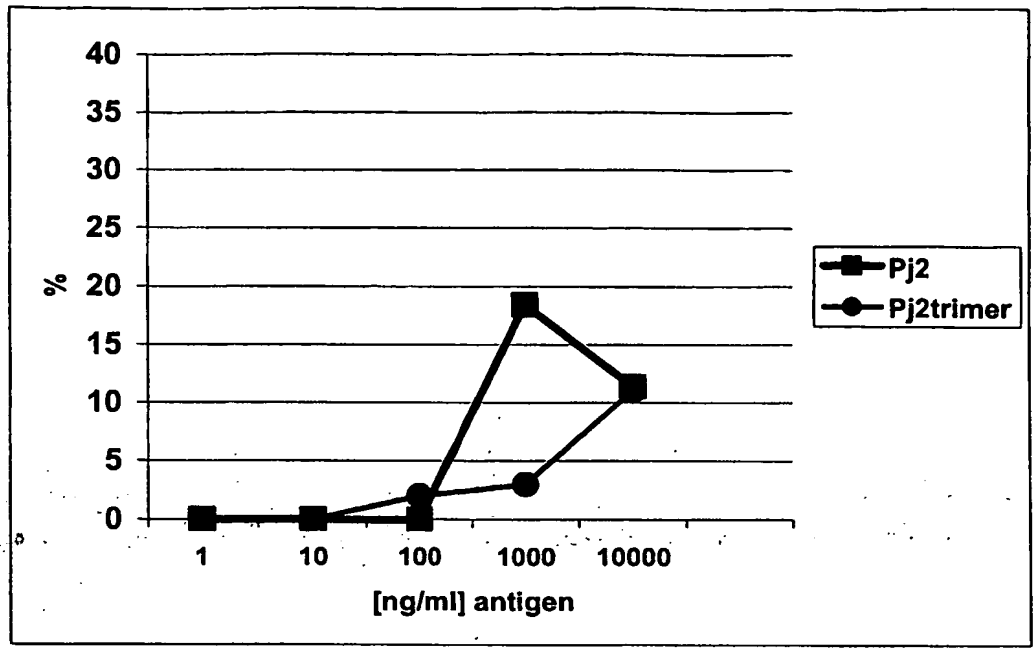


Fig.7

A


40
35
30
25
%
20
15
10
5
0
1
10
100
1000
10000
[ng/ml] antigen
Pj2
Pj2trimer

B

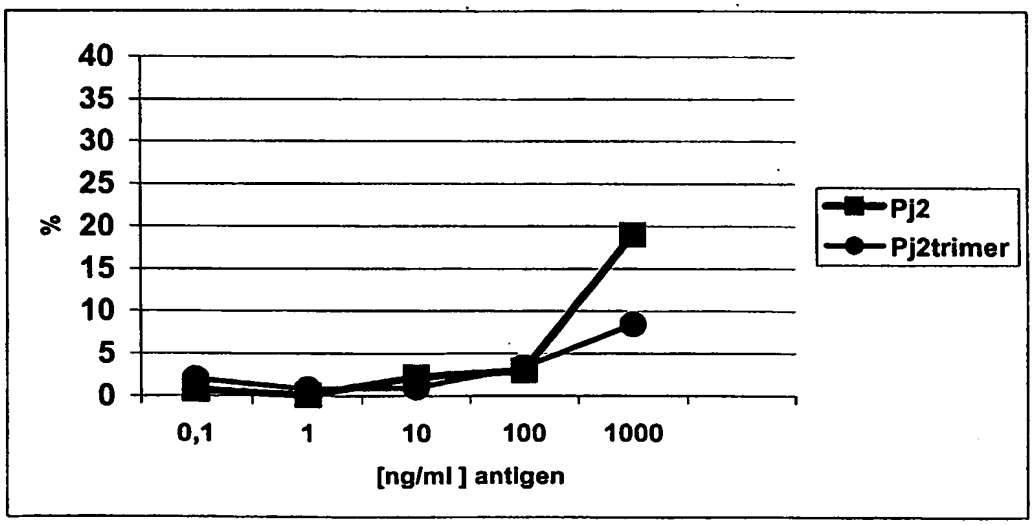
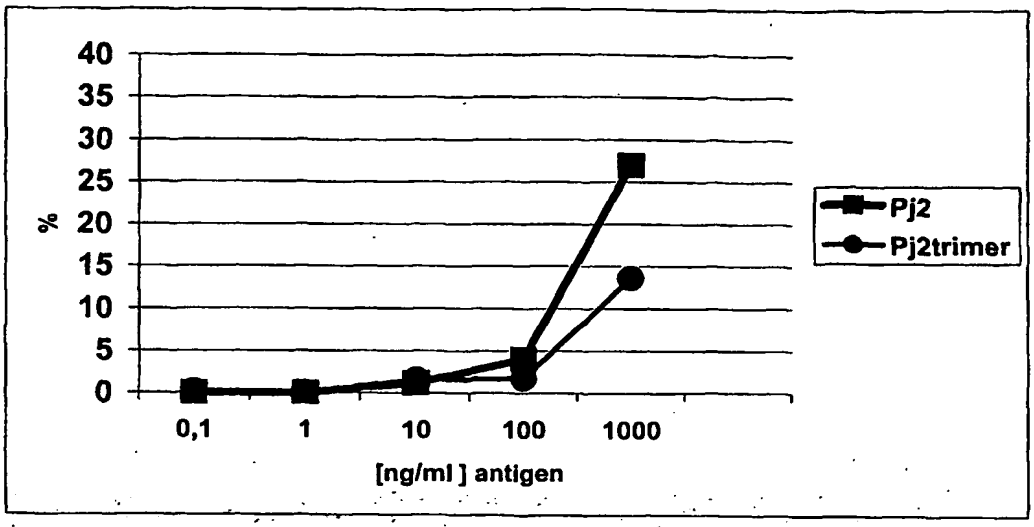

40
35
30
25
%
20
15
10
5
0
0,1
1
10
100
1000
[ng/ml] antigen
Pj2
Pj2trimer

Fig.8 (1/2)

C


40
35
30
25
20
15
10
5
0
%
0,1
1
10
100
1000
[ng/ml] antigen
Pj2
Pj2trimer

D

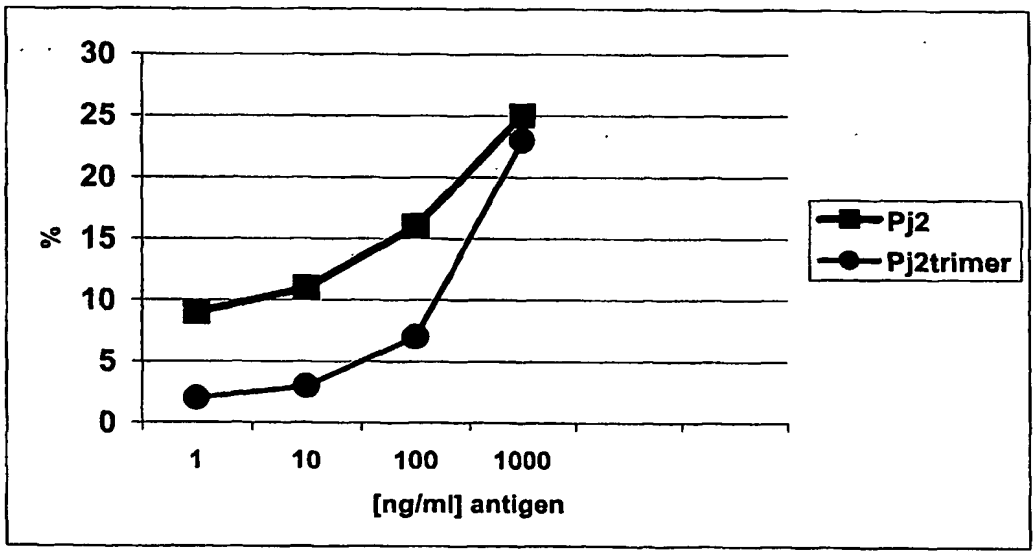
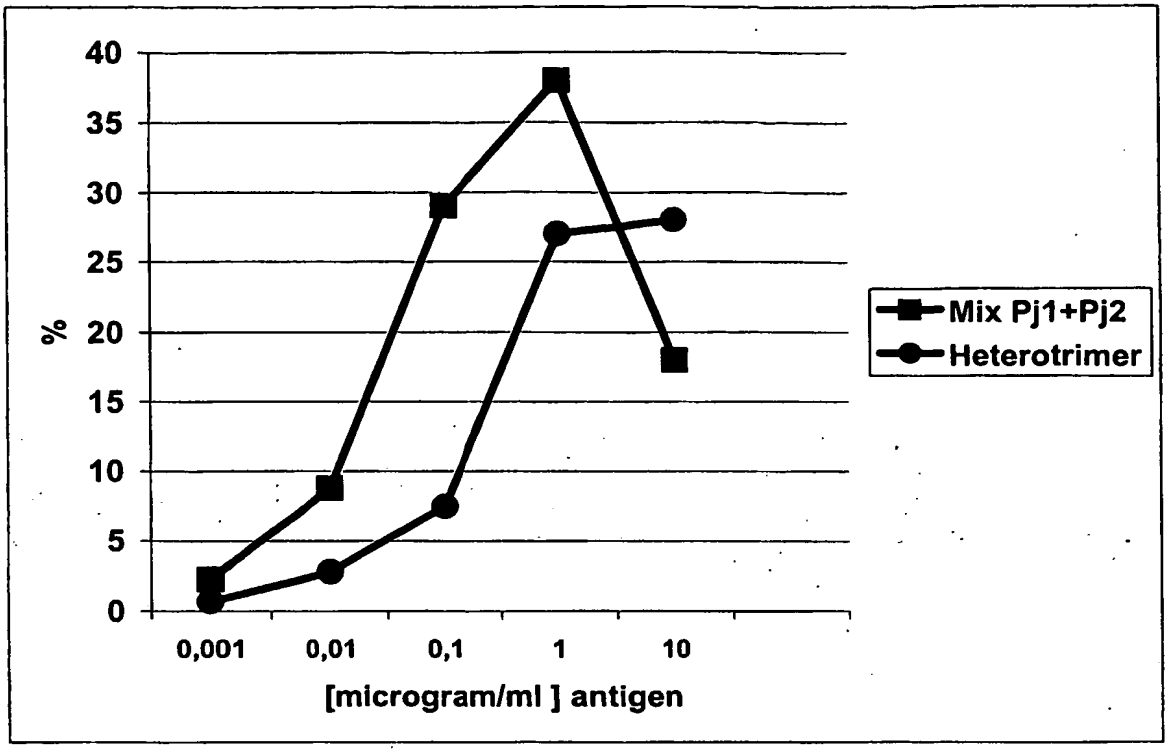

30
25
20
15
10
5
0
%
1
10
100
1000
[ng/ml] antigen
Pj2
Pj2trimer

Fig.8 (2/2)

A


40
35
30
25
20
15
10
5
0
%
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Mix Pj1+Pj2
Heterotrimer

B

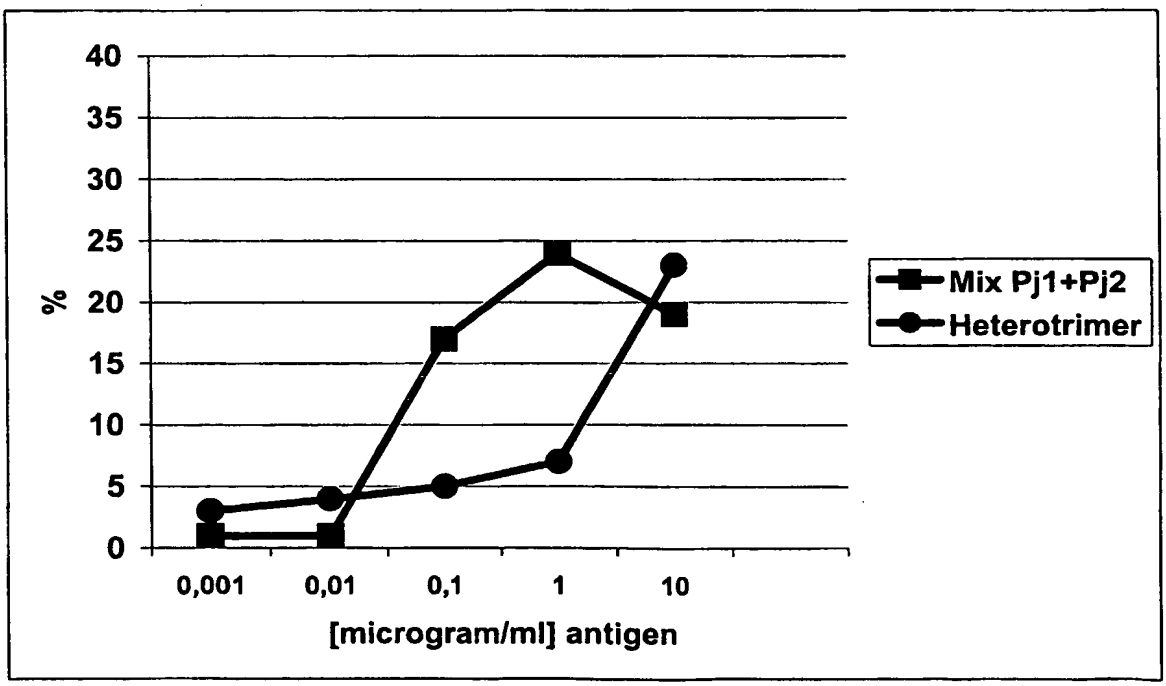

40
35
30
25
20
15
10
5
0
%
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Mix Pj1+Pj2
Heterotrimer

Fig.9 (1/2)

C

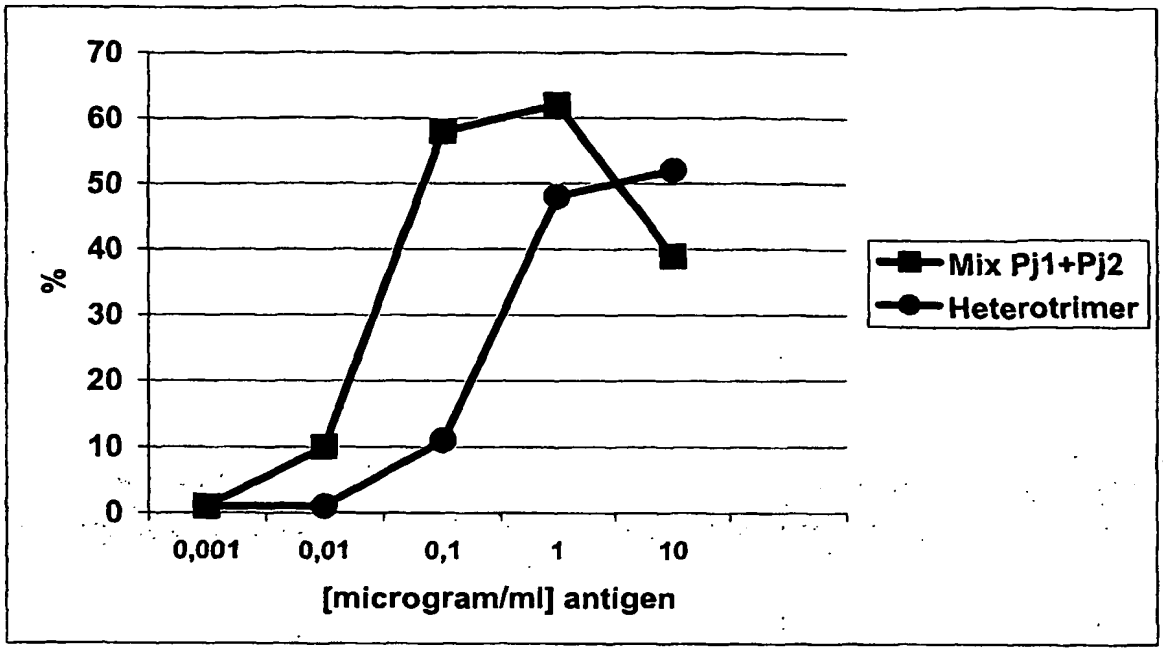

70
60
50
40
30
20
10
0
%
0,001
0,01
0,1
1
10
[microgram/ml] antigen
Mix Pj1+Pj2
Heterotrimer

Fig.9 (2/2)